

XYRIS CHAPMANII, A NEW SPECIES FROM THE GULF COASTAL PLAIN
OF THE SOUTHERN UNITED STATES

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ABSTRACT

Xyris chapmanii is described as a new species restricted to deep muck seepage bogs in the Gulf Coastal Plain of the southern United States, in Texas, Mississippi, Alabama and Florida. A key is provided to distinguish it from the similar *X. platylepis* and *X. scabrifolia*. The microhabitat factors and ecological relationships to other *Xyris* species are described based on field data from all eleven known sites for *X. chapmanii*.

KEY WORDS: *Xyris*, Xyridaceae, bogs, Gulf Coastal Plain, United States.

In a continuing field study of the distribution and ecological relationships of the genus *Xyris* in the Gulf Coastal Plain of the southeastern United States. In August 1988 we collected an unusual specimen in Wood County, Texas. In the field we tentatively identified this specimen as *Xyris torta*, a common species of seepage bogs and general wetland habitats in northeastern Texas. However, examination under magnification revealed that this collection lacked the strongly curvate and ciliate lateral sepal keel, and ciliate bract apex characteristics of *X. torta*. Further inspection revealed several additional differences in the plant base and seed characters. We revisited the site two months later and found the population to be quite uniform and distinct from the other *Xyris* species at the site, and made the type collection and preliminary description. Meanwhile, in September 1988 we had collected a large series of *Xyris* from sapric (having a deep organic soil surface horizon composed primarily of well decomposed plant material with little fibrous content) or deep muck bogs in the outer Coastal Plain of Mississippi. One of these, field identified as close to *X. scabrifolia* but lacking its characteristic scabrousness, was identical with our Wood County plant.

Not finding similar material in the literature or in herbaria consulted during our *Xyris* studies, and refusing to believe an undescribed species of the

southern United States could have persisted at only two isolated sites 620 km apart, we delayed publication pending further fieldwork. In September 1989 we sought this entity at numerous seepage and sapric bog sites in Florida, Alabama and Mississippi, and were rewarded with additional localities from all of these states. Although many apparently suitable sites in Florida and Alabama lacked this species, it occurred at every sapric bog we searched in Mississippi, often in large numbers. Repeated observations of fresh floral characteristics, general morphological consistency and lack of intermediates with other *Xyris* species at these sites provided much more evidence of its taxonomic distinctness.

The name honors Dr. A.W. Chapman (1809-1899), a long time resident of Apalachicola, Florida and the greatest of the 19th century contributors to our knowledge of North American *Xyris*. His 1860 *Flora of the Southern United States* included descriptions of nine new *Xyris* species, all based on his Apalachicola area collections. Seven of these are still recognized as distinct taxa and represent 28% of the 25 taxa now known from the United States and Canada. It seems appropriate to finally honor this early contributor to southern field botany with an epithet in the genus *Xyris*.

Xyris chapmanii Bridges & Orzell, *spec. nov.* TYPE: UNITED STATES.

Texas: Wood County. Deep muck seepage bog in small streamhead 0.2 mi N of Co Rd 3245 at a point 0.6 mi E of intersection of Co Rd 3235, ca. 0.5 mi upstream from end of SE arm of Lake Lydia, ca. 5 air mi SE of Quitman; Quitman 7.5' Quad., 32° 46' 27" N, 95° 22' 57" W, Elev. 400 ft., 8 Oct 1988, Orzell & Bridges 8714 (HOLOTYPE: TEX; Isotypes: FSU, GA, GH, NCU, NY, SMU, VDB).

Herba perennis, unicaulis vel laxe cespitosa, 4.5-9.5 dm alta, radicibus gracilibus fibrosis, per gemmas laterales squamatas luteolas basi plantae perennans; basis plantae saepe vestigiis fibrosis basium foliorum veterum vestita, in substrato (1-)4-5(-7) cm infossa. Folia erecta, linearia, (15-)47-58(-74) cm longa, spiraliter torta; vaginae integrae lamina 3-5-plo breviores, nitide spadiceae vel fusco-purpureae vel subroseo-purpureae, in laminam gradatim contractae, multicostatae, carinatae, margine pallidae; laminae compressae, lineares, multicostatae, perspiraliter tortae, virides. (1.5-) 2-4(-5) mm latae, pagina et margine laevibus. Vaginae scaporum arctae, nitide brunneolae vel ferrugineae, (10-)15-19 cm longae, lamina anguste lanceolata (5-)7-8(-15) mm longa, foliis principalibus multo breviori. Scapi lineari-filiformes, 48-92 cm longi, ad apicem 1.5-2 mm lati, spiraliter torti, inferne subteretes, distaliter subcompressae et bicostatae, costis 2-3 tenuioribus adjectis; costae majores distincte scabro-papillosae, costae minores laeves

vel scabro-papillosae. Spicae late ovoideae, acutae. (6-)10-11 (-13) mm longae. (5-)7-8 mm latae, pluriflorae; bracteae arcte spiraleriter imbricatae. suborbiculatae, 6 mm longae, 5-6 mm latae, nitide brunneolae. areis dorsalibus distincte ovatis viridibus (in vivo). Sepala lateralia inclusa, leviter curvata. 5-6 mm longa, carina alis paullo angustiori, integra vel lacera. Laminae petalorum obovatae, luteolae. 3 mm longae, ex apice 3 mm lata ad basin 2 mm latam contractae, apice truncato-obtusae, erosulae. Staminodia bibrachiata, brachiis sparse penicillatis. Capsula ellipsoidea, ca. 4 mm longa, 2.5-3 mm lata, placenta parietali. Semina anguste ellipsoidea (3:1), 0.6-0.8 mm longa, translucida vel opaca cremea, utrinque fusco-caudata, basi dilute flexa; striae longitudinales distinctae, brunneae, regulariter vel irregulariter dispositae, transversae irregulares, translucidae, tenuissimae.

Perennial herb, solitary or loosely cespitose, 4.5-9.5 dm high, the roots slender fibrous, perennating by means of scaly yellow lateral buds from base of plant; base of plant often clothed with fibrous remains of old leaf bases, the bases set (1-)4-5(-7) cm deep in the substrate. Leaves erect, linear, (15-)47-58(-74) cm long, spirally twisted; sheaths 1/5-1/3 as long as blade, entire, a lustrous brown to purplish brown or pinkish purple, tapering gradually to blade, multicostate, carinate, with a paler marginal zone; blades flattened, linear, multicostate, strongly spirally twisted, green, (1.5-)2-4(-5) mm wide, surfaces and margins smooth. Sheaths of scape tight, lustrous brown to red brown, (10-)15-19 cm long, with narrowly lanceolate blunt blade (5-)7-8(-15) mm long, much shorter than the principal leaves. Scapes linear-filiform, 48-92 cm long, 1.5-2 mm wide at apex, spirally twisted, basally subterete, becoming slightly flattened and bicostate above, with 2-3 additional, less prominent costae, the major costae distinctly scabro-papillose, the minor costae smooth or scabro-papillose. Spikes broadly ovoid, acute, (6-)10-11(-13) mm long, (5-)7-8 mm wide. several flowered, the bracts tightly spirally imbricate, orbicular, 6 mm long, 5-6 mm wide, lustrous brown with distinct ovate green (when fresh) dorsal areas. Lateral sepals included, slightly curvate, 5-6 mm long, keel slightly narrower than wings, entire to lacerate. Petal blades obovate, yellow, 3 mm long, tapering from 3 mm wide at apex to 2 mm wide at base, the truncate-rounded tip slightly erose. Staminodia bibrachiata, the branches densely penicillate. Capsule ellipsoid, ca. 4 mm long, 2.5-3 mm wide, the placentation parietal. Seeds narrowly ellipsoidal (3:1), 0.6-0.8 mm long, translucent to opaque creamy yellowish white, darkened caudate at both ends, the base slightly bent, with distinct, brownish, regularly to irregularly spaced longitudinal striations and irregular, translucent, very faint cross partitions.

Flowering from August to September, with mature seeds from September to October. Flowers opening in late morning (petal blades unfolding from 2-3

hours after sunrise), closing near midday.

Additional collections examined (Paratypes): UNITED STATES. Alabama: Baldwin Co.: Gently sloping streamhead seepage bog along small side road on N side US 90. 2.0 mi W of Seminole. 3.7 mi W of Perdido River and Florida state line. ca. 0.2 mi SE of Seminole Church: NEQ, Sec. 18. T6S. R6E; Elsamor 7.5' Quad.. 30° 31' 40" N, 87° 30' 18" W. Elev. 65 ft., 18 Sep 1989. *Orzell & Bridges 12358* (TEX). Mobile Co.: Hillside seepage shrub-herb bog on S side of Co Rd 96 (Beverly-Jefferies Rd). 7.1 mi W of int. US 45 in Citronelle, 1.3 mi W of Ramey Rd and 1.6 mi E of Escatawpa River bridge; NWQ, SWQ, NEQ, NEQ, Sec. 2. T1N, R4W; Citronelle West 7.5' Quad.. 31° 04' 49" N, 88° 21' 04" W, Elev. 160 ft., 18 Sep 1989. *Orzell & Bridges 12372* (FSU.GA.MO.NCU.SMU.TEX,VDB).

Florida: Santa Rosa Co.: Quaking sapric muck bog ca. 3 air mi S of FL 4 at a point ca. 3.4 mi E of Munson. at head of S-draining tributary of Middle Creek; NEQ, SWQ, NWQ, Sec. 35, T4N, R26W; Munson 7.5' Quad., 30° 48' 40" N, 86° 49' 12" W. Elev. 130 ft., 20 Sep 1989. *Orzell & Bridges 12450* (FLAS,FSU.GA.NCU.TEX,VDB).

Mississippi: Harrison Co.: Frequently burned quaking sapric peat streamhead bog on S side of MS 53, 6.1 mi NW of US 49 at Lyman, just W of CC Camp Rd.; NWQ, SWQ, Sec. 16, T6S. R12W; Wortham 7.5' Quad.. 30° 31' 17" N, 89° 12' 08" W, Elev. 90 ft., 23 Sep 1989. *Orzell & Bridges 12597* (IBE.TEX,VDB); Quaking deep muck low hillside bog on lower slope above Bayou Bernard. on W side of Co Rd, 0.3 mi N of New Hope, 1.3 mi N of int. I-10 at a point 2.3 mi W of US 49 N of Gulfport; NEQ, Sec. 13 & SEQ, Sec. 12. T7S, R12W; Gulfport NW 7.5' Quad.. 30° 26' 30" N, 89° 08' 25" W, Elev. 45 ft., 23 Sep 1989. *Orzell & Bridges 12598* (FSU,NCU,SMU.TEX); Sapric deep muck bog on W side of paved rd. 0.7 mi S of Stone Co. line, ca. 1.5 mi N of Riceville and 10 air miles W of Saucier; Center of SWQ, Sec. 4, T5S, R13W; Silver Run 7.5' Quad.. 30° 38' 13" N, 89° 18' 14" W, Elev. 180 ft., 23 Sep 1989. *Orzell & Bridges 12594* (FSU.GA.NCU.TEX,VDB). Jackson Co.: Sapric deep muck streamhead bog in ravine to E of Daisy-Vestry Rd. ca. 0.8 mi S of Indian Fork Rd., ca. 4 mi N of Latimer; SH, SWQ, SWQ, Sec. 23, T5S, R9W; Latimer 7.5' Quad., 30° 35' 24" N, 88° 51' 54" W, Elev. 70 ft., 23 Sep 1989. *Orzell & Bridges 12584* (FSU,G.A.IBE.MO.NCU.NY.TEX,VDB); Quaking sapric deep muck streamhead bog in ravine to E of Daisy-Vestry Rd. ca. 0.3 mi S of Indian Fork Rd, ca. 4.5 mi N of Latimer and 2 mi S of Larue; SH, SEQ, NWQ, Sec. 23, T5S, R9W; Latimer 7.5' Quad., 30° 35' 43" N, 88° 51' 40" W, Elev. 70 ft., 23 Sep 1989. *Orzell & Bridges 12587* (FSU,NCU.TEX,VDB). Stone Co.: Sapric deep muck streamhead saddle bog W of FS Rd 420. ca. 0.2 mi S of East McHenry Rd (FS Rd 401), ca. 0.5 mi N of Broadus Cem., ca. 8.5 mi E of McHenry; NH, SEQ, SWQ, Sec. 16, T4S, R10W; Beatrice 7.5' Quad., 30° 41' 40" N, 88° 59' 46" W, Elev. 130 ft., 24 Sep 1988. *Orzell & Bridges 8522* (TEX,VDB), 23 Sep 1989. *Orzell &*

Bridges 12590 (FLAS.FSU.GA.IBE.NCU,NY.SMU.TEX): Sapric deep muck hillside/streamhead bog along slope to N of FS Rd 420-E. ca. 0.3 mi W of FS Rd 417, ca. 0.6 mi S of East McHenry Rd (FS Rd 401), ca. 11 mi E of McHenry, along tributary of Bigfoot Creek; NH, SEQ. NEQ. Sec. 22, T4S, R10W; Beatrice 7.5' Quad., 30° 41' 16" N, 88° 58' 08" W. Elev. 110 ft., 23 Sep 1989, *Orzell & Bridges 12589* (FSU,NCU.SMU.TEX,VDB).

Texas: Wood Co.: Same as type locality (Topotypes). 18 Aug 1988, *Orzell & Bridges 8047* (TEX.VDB), 3 Aug 1989, *Orzell & Bridges 11359* (NCU,TEX, VDB).

Xyris chapmanii is restricted to constantly saturated, organic soils in deep muck seepage bogs and the muckiest areas of some hillside seepage bogs. It is most commonly found on soft, unstable, springy, spongy, peaty substrates of quaking vegetation mats and in seep spring runs within the bogs. Dominant species of this habitat often include the early summer flowering *Rhynchospora stenophylla* and the fall flowering *R. macra*. The wetter habitats of the species can have dense cover of *Mayaca fluviatilis* or *Orontium aquaticum*.

The only species which were strongly associated with *Xyris chapmanii* at every site surveyed were *Eriocaulon decangulare*, *Rhynchospora macra* and *Scleria reticularis*. Several additional species were associated at almost all sites within their known ranges, including *Aristida virgata*, *Coreopsis linifolia*, *Eryngium integrifolium*, *Fuirena squarrosa*, *Lachnocaulon digynum*, *Liatris spicata*, *Lophiola americana*, *Myrica heterophylla*, *Ozypolis filiformis*, *Sarracenia alata*, *Xyris fimbriata* and *X. scabrifolia*. Other frequent associates include *Arnoglossum ovatum*, *Baldunia uniflora*, *Bartonia paniculata*, *Bidens mitis*, *Burmannia capitata*, *Dichromena latifolia*, *Drosera tracyi*, *Eriocaulon compressum*, *Hypericum brachyphyllum*, *Ilex coriacea*, *Juncus trigonocarpus*, *Rhynchospora chalarocephala*, *R. oligantha*, *R. stenophylla*, *Sabatia macrophylla*, *Sarracenia psitticina*, *Tofieldia racemosa*, *Xyris baldwiniana*, *X. smalliana* and *Sphagnum* sp. Vascular plant nomenclature follows Godfrey & Wooten (1979, 1981) except where indicated.

The floristic composition of *Xyris chapmanii* habitats is remarkably consistent, with the exception of the long disjunct Texas site. The 239 observations of associates included 74 species, with only 47 of these recorded at more than one site. Thirtyfive species were recorded as associates at least three times, from an average of 21 (range = 9-31) close associates per site. At the Wood County, Texas site, the associates *Burmannia capitata*, *Rhynchospora chalarocephala*, *R. macra*, *R. oligantha*, *R. stenophylla*, *Sarracenia alata*, *Scleria reticularis* and *Xyris baldwiniana* are found at either their only or one of their very few northeast Texas localities. The microhabitat at the Mississippi sites overlaps the drier end of the habitat of *Carex exilis*, a long disjunct from northern wetlands to these sapric bog sites (Bryson, *et al.* 1988). *Syngonanthus flavidulus* was associated at only one Mississippi site, although it occurs at other sites in areas of shallower peat, more groundwater seepage and less standing water

(Bridges & Orzell 1989b)

Xyris chapmanii occurs in habitats noted for their abundance and diversity of *Xyris* species. Other species of *Xyris* present at the type locality are *X. baldwiniana*, *X. jupicai* and *X. torta*. Most other sites have from seven to nine *Xyris* species, with seven of these strongly associated with *X. chapmanii* at at least one site and the four others present within the macrohabitats (*X. caroliniana*, *X. jupicai*, *X. louisianica* [Bridges & Orzell 1987], and *X. torta*) never found in close association with *X. chapmanii*. *Xyris chapmanii* most often occurs where the microhabitats of *X. scabrifolia* and *X. fimbriata* overlap within a site. In terms of numbers of plants, *X. chapmanii* is usually one of the rarest species of these habitats, being generally far outnumbered by *X. scabrifolia*, *X. baldwiniana* and *X. ambigua*, and less conspicuous than the taller and larger spiked *X. fimbriata* and *X. smalliana*. The occasionally associated *X. drummondii* and *X. difformis* var. *curtissii* are much more common in the more oligotrophic to weakly minerotrophic hillside seepage bogs and in areas where seepage emerges on slopes above the more ombrotrophic microhabitats of *X. chapmanii*. *Xyris chapmanii* is yet to be found in the typical matrix of the hillside seepage bogs that commonly occur in the longleaf pine hills of the coastal plain, although it does occur in close proximity to these microhabitats when lower, peaty areas occur downslope. The more typical matrix of hillside seepage bogs tend to have a *Xyris* complement that includes *X. ambigua*, *X. baldwiniana*, *X. difformis* var. *curtissii*, *X. drummondii* and *X. scabrifolia* (Bridges & Orzell 1989a).

In general habit, *X. chapmanii* resembles *X. torta*, but lacks the bulbous brown base of this species formed by the outermost scale leaves. In addition, *X. torta* has a strongly curvate, thick, ciliate lateral sepal keel, apical tufts of hairs on the fertile bracts and seeds only 0.4-0.5 mm long. *Xyris chapmanii* bears some similarity to solitary specimens of *X. baldwiniana* from very wet sites; however, the leaves lack the abruptly expanded, hard bases of this species, the scapes and leaves are much longer, and the staminodia are bearded. Using the keys in Kral (1966), *X. chapmanii* would pose problems at the couplet (#17) distinguishing *X. platylepis* and *X. scabrifolia* from the remaining species. It has the flexuous, twisted scapes and leaf blades of *X. platylepis* and *X. scabrifolia*, but lacks their distinct outer scale leaves and bulbous base. The leaves are much narrower than those of *X. platylepis* (5-10 mm) and at the narrow end of the range of leaf width of our collections of *X. scabrifolia* (3-10 mm). However, the leaf and scape surfaces and margins are strongly papillose-scabrid in *X. scabrifolia*, in contrast to the essentially glabrous *X. chapmanii*. The petal blades of *X. chapmanii* are also smaller and a different shape than those of *X. platylepis* and *X. scabrifolia*, and the spikes tend to be shorter and more acute.

The following key substituted for couplet #17 in Kral (1966) or couplet #14 in Godfrey & Wooten (1979) should effectively distinguish *X. chapmanii*

from other southeastern United States *Xyris* species.

17. Scapes flexuous, usually spirally twisted: upper portion of leaf blade conspicuously twisted; plant bases pinkish, purplish, or dark brown . A
17. Scapes usually not flexuous, the scapes and leaf blades not conspicuously twisted; plant base color various (leads to *X. difformis*, *X. iridifolia*, *X. montana*, *X. serotina* and *X. jupicai*)
- A. Base of plant deeply set in the substrate, without distinct outer scale leaves; leaf bases not noticeably expanded, thus the plant base not bulbous; leaves smooth, 2-4 mm wide; petal blades ca. 3 mm long *X. chapmanii* Bridges & Orzell
- A' Base of plant shallowly set on the substrate, often with short, black outer scale leaves, leaf bases noticeably expanded to form short bulbous bases; leaves scabrous, 3-10 mm wide, or when smooth, then 5-10 mm wide; petal blades ca. 5 mm long 18
18. Leaf and scape surfaces smooth or scabrous only along the margins and ridges; petal blades obovate; seeds ovoid, 0.5-0.6 mm long *X. platylepis* Chapm.
18. Leaf and scape surfaces prominently papillose or tuberculate-scabrid; petal blades suborbicular; seeds narrowly ovoid or narrowly ellipsoidal, ca. 1 mm long *X. scabrifolia* Harper

We found no previous collections of *Xyris chapmanii* at FSU, SMU or TEX-LL. It is possible that additional collections of this species may exist under other names in other herbaria; however, considering its rarity and the paucity of collections of the associated and much more frequent *X. scabrifolia* (Kral 1966; Bridges & Orzell 1989a), it probably was very rarely, if at all, collected before our 1988 discovery.

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LITERATURE CITED

- Bridges, E.L. & S.L. Orzell. 1987. A new species of *Xyris* (sect. *Xyris*) from the West Gulf Coastal Plain. *Phytologia* 64:56-61.
- . 1989a. Additions and noteworthy vascular plant collections from Texas and Louisiana, with historical, ecological, and geographical notes. *Phytologia* 66:12-69.
- . 1989b. *Syngonanthus flavidulus* (Eriocaulaceae) new to Mississippi. *Sida* 13:512-515.
- Bryson, C.T., W. McDearman & K.L. Gordon. 1989. *Carex exilis* Dewey (Cyperaceae) in Mississippi bogs. *Sida* 13:171-175.
- Godfrey, R.K. & J.W. Wooten. 1979. *Aquatic and Wetland Plants of Southeastern United States - Monocotyledons*. Univ. of Georgia Press, Athens. 712 pp.
- . 1981. *Aquatic and Wetland Plants of Southeastern United States - Dicotyledons*. Univ. of Georgia Press, Athens. 933 pp.
- Kral, R. 1966. *Xyris* (Xyridaceae) of the continental United States and Canada. *Sida* 2:177-260.